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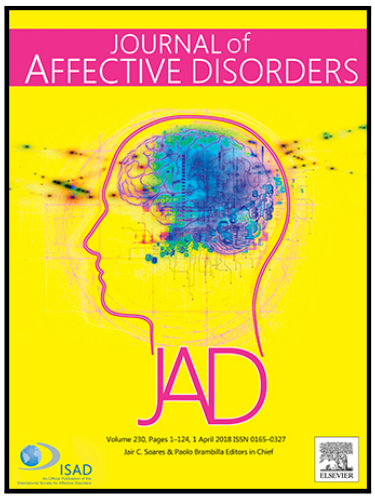

Prevalence of common mental disorders in widowhood: A systematic review and meta-analysis

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Highlights

- Widowhood is associated with a high prevalence of common mental disorders
- About 40% meet the cut-off for depression using screening scales
- About 20% meet full diagnostic criteria for depression
- There was no difference in the prevalence of depression between the two sexes
- The pooled prevalence estimate of anxiety disorders was about 27%

Prevalence of common mental disorders in widowhood: A systematic review and meta-analysis

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Keywords

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Common mental disorders

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Anxiety Disorders

Epidemiology

Systematic Review

Meta-analysis

Abstract

Background

Widowed people have a high risk of common mental disorders, however no summary estimates of the prevalences exist. The aim of this study was to conduct a systematic review and meta-analysis of the prevalence of common mental disorders in widowed people in the community.

Methods

MEDLINE, Embase and PsycInfo were searched for papers reporting on prevalence of common mental disorders and widowhood. Eligible studies were included in random effects meta-analyses of the prevalence of depression and anxiety disorders. Subgroup analyses were performed on method of assessment of depression and age and sex.

Results

The literature search identified 13,781 titles of which 42 were eligible for meta-analysis. The pooled prevalence of depression in studies using a screening scale was 40.6% (33.6%-47.6%) (n=30). For studies using full diagnostic criteria the pooled prevalence of depression was 19.2% (13.4%-25.0%) (n=12). Subgroup analyses of age (≥ or <65) and sex did not show any differences regarding depression. Five studies reported the prevalence of anxiety disorders. The pooled prevalence estimate was 26.9% (8.1%-45.7%).

Limitations

The prevalence estimates in this study are summary estimates of prevalences from existing literature. Although the reporting bias assessment showed no evidence, there could be some reporting bias, as studies might only present results if there is a high prevalence.

Conclusions

Widowed people have a high prevalence of depression and anxiety disorders. The high prevalence of depression was independent of age and sex. The study identifies a population group at high risk needing special attention in clinical practice.

1. Introduction

Common mental disorders, that is depression and anxiety disorder, are highly prevalent world-wide. In a meta-analysis of 155 studies, Steel et al (2014) found a pooled 12-month prevalence estimate of 17.6% (16.3%-18.9%) of common mental disorders (including both depressive, anxiety and substance use disorders). For specific clinical domains they found a pooled period prevalence of 5.4% (4.9%-6.0%) for mood disorders and 6.7% (6.0%-7.6%) for anxiety disorders. This is comparable to Baxter et al (2013) who found a global prevalence estimate of 7.3% (4.8%-10.9) for any anxiety disorder and Ferrari et al (2012) who similarly found a global prevalence estimate of 4.7% (3.7%-5.5%) for major depressive disorder. The prevalence however, is not equally distributed across population groups. Epidemiologic studies often stratify for marital status when examining the prevalence of common mental disorders and those who are widowed often have an increased risk, when compared to those who are married (Rai et al, 2013). Widowed men have more depressive symptoms than married men, and widowed women have more depressive symptoms than married women. The level of depressive symptoms in widowed men and women, respectively, seems however to be similar at least in old age (Schaan, 2013, Sasson and Umberson, 2014). To our knowledge, there are no studies comparing the risk of widowhood associated depression across age groups.

In 2006 Onrust and Cuijpers conducted a review of the prevalence of common mental disorders in widowhood and found a pooled prevalence of 17.5% for major depressive disorder. This review included only studies that used full diagnostic criteria and included only few studies, some with a selected sample (Onrust and Cuijpers, 2006). Therefore, the results of this review have reduced comparability to most general population epidemiologic studies. To allow resources for larger

scale studies, most general population epidemiologic studies use screening scales such as The Centre for Epidemiologic Studies of Depression (CES-D) (Lenore Sawyer, 1997), Beck Depression Inventory (BDI) (Beck et al, 1961) or Geriatric Depression Scale (GDS) (Brink et al, 1982). To give the best summary estimate of the prevalence of common mental disorders in widowed people in the community it is therefore necessary to include not only full diagnostic criteria studies, but also studies that use screening scales.

Nonetheless, there are no existing summary estimates of the prevalence of common mental disorders in widowed people living in the community. Therefore, there is a need for an examination of the pooled prevalence of common mental disorders in widowed people in the community setting including assessment by both full diagnostic criteria and screening scales. The aim of this study was to conduct a systematic review and meta-analysis of studies that assessed the prevalence of common mental disorders, either using full diagnostic criteria or screening scales, among widowed people living in community settings.

2. Methods

This systematic review and meta-analysis was reported in accordance with Meta-analysis of Observational Studies in Epidemiology (MOOSE) guidelines (Stroup et al, 2000). Before beginning this review the PROSPERO and the Cochrane Database of Systematic Reviews and MEDLINE was searched (December 13 2016). No existing or on-going reviews with overlapping research questions were found. The protocol was developed guided by the PRISMA-P checklist (Moher et al, 2015). Prior to conducting the systematic review the protocol was registered on PROSPERO (Kristiansen et al, 2017).

2.1 Search strategy

A search of electronic databases was conducted using MEDLINE, Embase and PsycInfo from the earliest record in the databases until May 2017 were the search was first conducted. An update of the literature search was conducted October 12, 2018. The search strategies consisted of a combination of search terms regarding widowhood and common mental disorders and were reviewed by a research librarian. The full search strategy for each database is available in Online Supplementary 1. Two authors (CBK, PH) individually assessed the eligibility of studies according to the inclusion criteria using the literature-screening software Covidence (2018). In cases of disagreement a third investigator was involved (MP, PH).

2.2 Eligibility criteria

Studies were eligible if they: 1) examined the prevalence of common mental disorders in widowed persons 2) were conducted in a community setting 3) using a validated screening scale or full diagnostic criteria of the disorder 4) were cross-sectional and 5) were published as an original paper in a peer-reviewed journal. There were no restrictions on age and sex of the participants. Studies were included regardless of whether there was a group of comparison or not. Studies were included from the earliest record and until date of search (October 12, 2018). Conference and dissertation abstracts were excluded. There were no pre-defined restrictions on language.

2.3 Data extraction and Quality assessment

Data were extracted by the first author according to the pre-specified form in the study protocol (Kristiansen et al, 2017). For control, a second author (JNK) independently extracted data from a random sample of 10% (n=12) of all papers screened relevant for inclusion. No discrepancies were found. Quality was assessed using a version of the Newcastle-Ottawa Quality Assessment Scale (Wells et al, 2008), which was modified for this review specifically (Modesti et al, 2016, Kristman et al, 2004). The full quality assessment manual and form are available in Online Supplementary 2. Studies were quality assessed by two authors independently (CBK, JNK) and were reassessed if disagreement between ratings.

2.4 Data-analysis

Pooled prevalence estimates were calculated using random effects meta-analysis of proportions in the statistical software Stata 15 (2017). Heterogeneity was assessed using I squared (Higgins et al, 2003). Subgroup estimates were compared using random-effects meta-regression and were conducted in accordance with the study protocol (Kristiansen et al, 2017). Publication bias was evaluated by inspection of funnel plots of the log-odds against standard error and Egger's test of small study effect (Egger et al, 1997, Sterne et al, 2011). Level of statistical significance was set at $p<0.05$.

3. Results

3.1 Identification and study characteristics

The literature search identified 13,781 titles of which 42 were eligible for inclusion in the meta-analysis (Fig. 1) (Almeida-Filho et al, 2004, Arias-de la Torre et al, 2018, Asokan et al, 2018, Bartwal et al, 2017, Bekaroglu et al, 1991, Bergdahl et al, 2007, Bielecki et al, 2015, Blazer and Williams, 1980, Cakici et al, 2017, Cardona et al, 2015, Carpiniello et al, 1989, Cho et al, 1998, Clayton et al, 1972, de Oliveira et al, 2012, Deyessa et al, 2008, El-Sherbini et al, 2009, Golden et al, 2009, Hailemariam et al, 2012, Hallstrom and Persson, 1984, Jacobs et al, 1989, Jones-Webb and Snowden 1993, Kennedy et al, 1989, Luppa et al, 2012, Madianos et al, 2012, Mossie et al, 2016, Nahcivan and Demirezen, 2005, O'connor, 2010, Ohayon et al, 1999, Onrust et al, 2007, Pahkala et al, 1995, PS et al, 2017, Risal et al, 2016, Sapranaviciute-Zabazlajeva et al, 2014, Sinha et al, 2013, Skapinakis et al, 2013, Somhlaba and Wait, 2008, Stephenson-Cino et al, 1992, St John and Montgomery, 2009, Vezina et al, 1998, Ward et al, 2007, Yopp et al, 2015, Williams et al, 1992). All 42 studies reported on the prevalence of depression and five studies also reported the prevalence of anxiety disorders (Risal et al, 2016, Ward et al, 2007, Somhlaba and Wait 2008, Williams et al, 1992, Pahkala et al, 1995). There were no studies eligible for meta-analysis that only reported the prevalence of anxiety disorders. The studies were conducted from 1968 through 2016 in 27 different countries and included a total number of 15,607 widowed people in the studies of depression prevalence, ranging from 20 to 3031 (mean 372, SD 541.7) in each study. For anxiety disorders the samples ranged from 25 to 3031 (mean 714, SD 580.2) summing up to a total of 3570 widowed persons. Further characteristics of the studies are presented in Table 1. Quality assessment scores are presented in Supplementary Table 1.

(Figure 1 about here)

(Table 1 about here)

3.2 Prevalence of depression by method of assessment

The pooled prevalence estimate of all 42 studies reporting on depression was 34.9% (29.4%-40.4%) (results not shown). In this analysis all methods of assessment were pooled together, with very high heterogeneity (I^2=99.0%, p<0.01), as well as a range covering almost the entire prevalence spectre from 3.7% (3.1%-4.4%) in the lower to 87.9% (82.6%-91.7%) in the upper end. To account for some of the heterogeneity, prevalence estimates of depression were meta-analysed, and sub grouped by method of assessment, that is by using full diagnostic criteria or screening scales, respectively (Figure 2). Studies that used a screening scale (30 studies) had a pooled prevalence estimate of 40.6% (33.6%-47.9%), and high in-group heterogeneity (I^2=98.8%, p<0.01). This was significantly different (p<0.01) from the pooled estimate of 19.2% (13.4%-25.0%) for the studies that used full diagnostic criteria (12 studies, in group heterogeneity I^2=95.8%, p<0.01). The continued high heterogeneity seen, especially for the studies using screening scales, could not be explained by further differentiation of subgroups by method of assessment, as it was not possible to do further subgroup analyses of the studies that used screening scales. Too few studies used the same screening scales, and in those studies that did use the same scales, different cut-off scores were often used.

Regarding studies using a clinical diagnosis, we carried out a subgroup analysis using the diagnostic criteria used (i.e. ICD or DSM). This did not show a significant difference between the two groups (p=0.241, results not shown). It was not possible to differentiate between the versions (e.g. DSM-III vs DSM-IV) of diagnostic criteria used as there were too few studies using each version.

(Figure 2 about here)

3.3 Prevalence of depression by sex

Seven studies were eligible for a meta-analysis of the prevalence of depression in widowed men (n=1421). The pooled prevalence estimate was 25.0% (10.2%-39.8%), with a range from 6.6% (4.7%-9.1%) to 64.9% (58.9%-70.4%). High in-group heterogeneity was found (I^=98.5%, p<0.01). Nine studies were eligible for a subgroup analysis of the prevalence of depression in widowed women (n=6070). The pooled prevalence estimate of depression was 22.2% (13.0%-31.3%). The prevalence estimates reported in women ranged from 3.1% (2.5%-3.9%) to 44.6% (34.4%-55.3%), also with high in-group heterogeneity (I^2=98.9%, p<0.01). There was no significant difference between the two sexes (p=0.749).

3.4 Prevalence of depression by age group

Eligible studies were divided into those who examined participants aged ≥65 (13 studies, n= 4857) or <65 (8 studies, n=1124). We found no difference between the two age groups, as the pooled prevalence estimates were 28.2% (21.2%-35.3%) and 27.9% (18.3%-37.5%), respectively (p=0.060).

3.5 Prevalence of anxiety disorders

Five studies were eligible for a meta-analysis of the prevalence of anxiety disorders. The prevalence reported in the studies ranged from 5.3% (4.5%-6.1%) to 60.1% (53.2%-66.7%). A pooled prevalence of 26.9% (8.1%-45.7%) was found (Figure 3). High heterogeneity (I^2=98.6%, p<0.01) between studies was seen.

(Figure 3 about here)

3.6 Assessment of publication bias

There was no significant reporting bias in studies reporting on depression (Egger's test p=0.300) (Supplementary Figure 1). It was not possible to assess reporting bias in the studies examining anxiety disorders as too few studies were included (Sterne et al, 2011). Funnel plot of log-odds against sample size has been suggested to be more appropriate than using standard error on the vertical axis in proportion studies (Hunter et al, 2014). When applying this method no asymmetry was found in the funnel plot of depression, supporting our findings from the traditional funnel plot and Egger's test.

4. Discussion

The aim of this systematic review and meta-analysis was to estimate the prevalence of common mental disorders in widowed people in the community. The pooled prevalence estimate of studies reporting on the prevalence of depression was about 41% when assessed using a screening scale

(30 studies) and about 19% when full diagnostic criteria were used (12 studies). The pooled prevalence estimate of anxiety disorders was about 27% (5 studies).

Overall, the findings of this study show that both depression and anxiety disorders are more frequent in widowed people than in the general population (Steel et al, 2014, Baxter, 2013, Ferrari et al, 2012). In fact, the prevalence estimates of depression found in widowed people in this meta-analysis, were about twice the prevalence estimates of depression found in general in the community when accounting for method of assessment (Lim et al, 2018), stressing that this is a high-risk section of the population.

There was a both clinically and statistically significant difference in the pooled prevalence estimates of depression when analysing by method of assessment. The pooled prevalence estimate was more than double in the studies using a screening tool compared to those that used full diagnostic criteria. This finding is in line with a recent meta-analysis of the prevalence of depression in the community that had an almost doubling of the prevalence in studies using self-report tools compared to studies with a clinical assessment (Lim et al, 2018). The screening scale studies are likely to be overestimating the true prevalence. Nonetheless, they are important to include, because they give an estimation of the occurrence of clinically significant depressive symptoms, associated with an increased risk of developing depressive disorders. Thus, with almost half (40.6%) of all widowed people rated as depressed according to screening scales, it stresses that this is indeed a population group at high risk of developing full-blown depressive disorders. This is even further underpinned by the prevalence estimate found in studies using a clinical diagnosis, that almost 1 in every 5 widowed people meet full diagnostic criteria for depressive disorder. This is supported by a similar prevalence (17.5%) found in a previous systematic review

of the prevalence of depression in widowed people, only including studies which used full diagnostic criteria of major depressive disorder (Onrust and Cuijpers 2006). This is despite methodological differences regarding the sample and other inclusion criteria, and only one overlapping study (Jacobs et al, 1989) being included in both reviews.

Possible sex differences of depression in widowhood have been studied extensively, however, no previous meta-analysis of this exists. We found no statistically significant difference in the prevalence estimates of depression between sexes. This is an important finding, since women in the general population have a higher prevalence of depression than men (Hunter et al, 2014) indicating that the relative risk of depression in widowhood is higher in men than in women. Thus, our findings are supportive of previous findings, that in terms of widowhood related depression men suffer more (Hailemariam et al, 2012, Lee et al, 2001). The pooled prevalence estimate of depression was higher in men than in women. With only 7 studies of men and 9 studies of women included, this stresses that further studies of sex differences are needed, as the disadvantage for men might be even higher, than what the present findings suggest.

Besides the increased risk of common mental disorders, widowhood is also associated with an increased risk of mortality compared to married counterparts, particularly in men (Shor et al, 2012). At least some of this is due to a highly increased risk of suicide, especially in the younger age groups (Ajdacic-Gross et al, 2008, Luoma and Pearson, 2002). Considering this, it could be hypothesized, that depression might be higher in the younger age groups, as depression could be contributing to the increased risk of suicide. We did not find any evidence of this hypothesis in this meta-analysis. There was no difference in the prevalence of depression between age groups when dichotomizing into either ≥ or <65. Due to the sample of the studies included it was not

possible to do further stratification of age, neither was it possible to examine the effect of age on the two sexes. Further research of different age groups at risk is still needed, as the suicide statistics does suggest, that there might be differences across age groups, and it is likely that these are not in accordance with the traditional dichotomization.

Time since spousal loss is only reported in some of the studies included and is therefore not included in this meta-analysis. Thus, the prevalence estimates are overall estimates for all widowed people independently of whether a person has been widowed for one month or for ten years. Most likely, the prevalence does vary with time since spousal loss (Zisook and Shuchter, 1993), and previous studies have shown that although the impact on mental health exist into long-term widowhood the biggest risk is at the time of spousal loss (Burns et al., 2015). The high prevalence found in this study, not depending on time, however stresses, that independently of time since spousal loss, widowed people are a high-risk group in terms of developing common mental disorders. For development of preventive measures targeting specific subgroups at risk, there is a need for defining specific times since bereavement where the risk of depression is at its highest.

This review does not contribute with knowledge about possible causes of the increased risk of common mental disorders in widowhood as this is not possible based on a prevalence analysis. Previous studies however have identified socio-cultural factors such as loneliness and complicated grief as risk factors of depression (Bergman and Segel-Karpas, 2018, Siu, 2016). Complicated grief is a possible differential diagnosis which should also be considered in widowhood (Simon, 2013, Shear, 2015). It is beyond the scope of this review to differentiate between what should be

considered complicated grief and what should be considered depression. However, there are multiple overlaps of the symptoms in the two diagnoses (Shear, 2015), and therefore, this differential diagnosis should be considered when assessing patients in daily clinical practice (Simon, 2013).

4.1 Strengths and Limitations

The literature screening and selection for this study was exhaustive with few predefined exclusion criteria, lowering the risk of missing studies due to over-exclusion. Nonetheless, the study might have a degree of publication bias. We included all cross-sectional studies reporting on the prevalence of common mental disorders in widowed people including both studies that specifically studied widowhood, but also studies that examined prevalence in the general population in the community and stratified for marital status. It is not unlikely, that studies examining the general population would only report the stratified results if there were any differences between groups. This speculation is augmented by the fact that all of the studies included in the meta-analysis which had some group of comparison reported that widowhood was associated to an increased risk of depression. Although our visual and statistical examination showed no statistically significant publication bias, there might be a degree of outcome reporting bias, causing an overestimation of the pooled prevalence estimate. Another limitation is the exclusion of studies due to language. There were no predefined exclusion criteria in terms of language. However, we identified five abstracts which we were not able to full-text screen due to language (three Chinese, one Korean, one Greek). Since we have only included few studies conducted in Asia, none of which are from China, the results from the Chinese papers especially

could have been important for our overall findings. We did however, try to minimize bias due to exclusion because of language as much as possible, and have, besides from English studies, assessed (and included if eligible) papers in German, Japanese, French, Portuguese and Spanish. Due to the high heterogeneity seen in the study it could be argued, that a narrative synthesis of the results would be appropriate. The aim of this study however, was to give the best estimate of prevalence of common mental disorders in widowhood based on existing data, and therefore the quantitative analysis was maintained in accordance with previous suggestions (Barendregt, 2013). We addressed the heterogeneity by exploring possible sources of this by subgroup stratification of both method of assessment and clinical features, as suggested in methodological papers (Mueller, 2018, Barendregt, 2013). The subgroups examined were predefined in the study protocol as recommended (Mueller, 2018). The meta-analysis of depression by method of assessment marginally lowered the in-group heterogeneity for the studies using a clinical diagnosis but not for studies using a screening scale. Thus, at least some of the overall heterogeneity could be explained by differences in diagnostic systems, screening scales and cut-off scores used. Given the limited number of studies that used each different screening scale, it was not possible to do further sub-group differentiation to explore causes of heterogeneity in this group.

The major strength of this study is the systematic methodological approach used. The study is conducted in accordance with the study protocol (Kristiansen et al, 2017), which was prepared in accordance with the PRISMA-P checklist (Moher et al, 2015). The protocol was registered at PROSPERO prior to beginning the study. Furthermore, the reporting of the study is in accordance with the MOOSE guidelines of reporting meta-analysis of observational studies (Stroup et al, 2000).

4.2 Implications of the findings

The prevalences of depression and anxiety disorders found in this study show that widowhood is associated with a high risk of common mental disorders. It is important to notice that the prevalence estimates presented in this study are summary estimates calculated from random effects meta-analyses of the prevalence estimates found in existing studies. Thus, the prevalence estimates we have found are summary estimates and do not necessarily show the true prevalence in the population. The estimates however, are based on data from an exhaustive literature search of the area. Thus, despite having some limitations these estimates presented in this study are the best current estimates of the prevalence in the population, and it is evident from the data that widowhood is associated with a high frequency of depression and clinically significant depressive symptoms in the community.

5. Conclusion

This systematic review and meta-analysis examined the risk of common mental disorders in widowed people. Almost 1 in 5 widowed people met full diagnostic criteria for depression, stressing that this is a high-risk group in the population. We found no significant differences of prevalence between sexes, indicating, that the risk of depression is especially increased for widowers. Only 5 studies examined the prevalence of anxiety disorders in widowhood, however, their pooled prevalence of more than 25% stresses the need for further studies of widowhood and anxiety disorders. Future research of widowhood associated depression should focus on specific

subgroups at risk especially regarding more detailed research of age groups, the association of sex and age and the impact of time since spousal loss.

Author statement:

Author contributions

Christina Blanner Kristiansen: concept, design and protocol development, literature search, identification and selection, data extraction, quality assessment, conducting analysis and writing paper.

Jesper Nørgaard Kjær: literature search, identification and selection, quality assessment, critical revision of paper.

Peter Hjorth: literature search, identification and selection, critical revision of paper

Kjeld Andersen: concept, design and protocol development, obtainment of funding, critical revision of paper

Matthew Prina: concept, design and protocol development, conducting analysis, critical revision of paper

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Conflicts of interest

All authors declare they have no conflicts of interest

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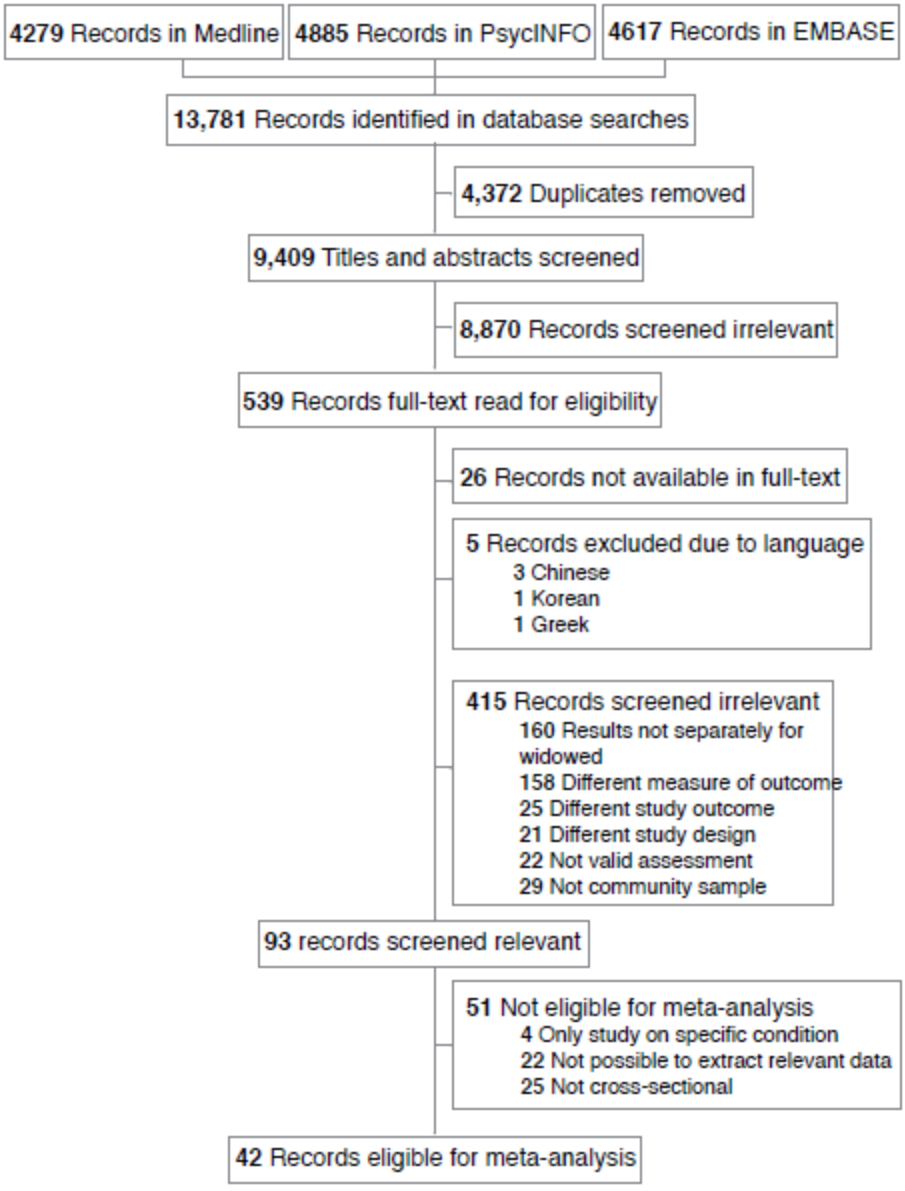

Figure 1. Flowchart of literature identification and selection

Table 1. Study characteristics

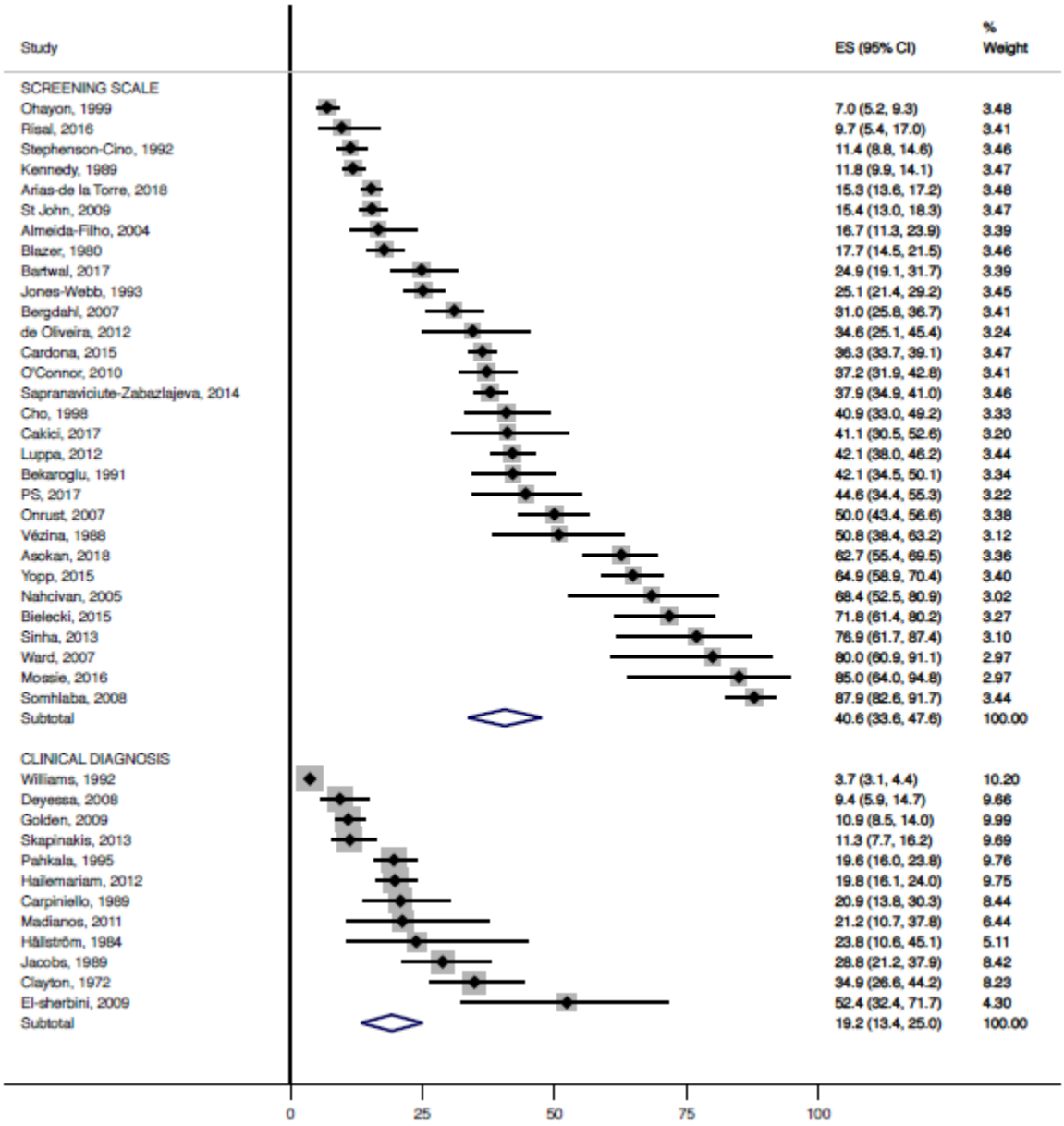

Figure 2. Meta-analysis of depression prevalence by method of assessment

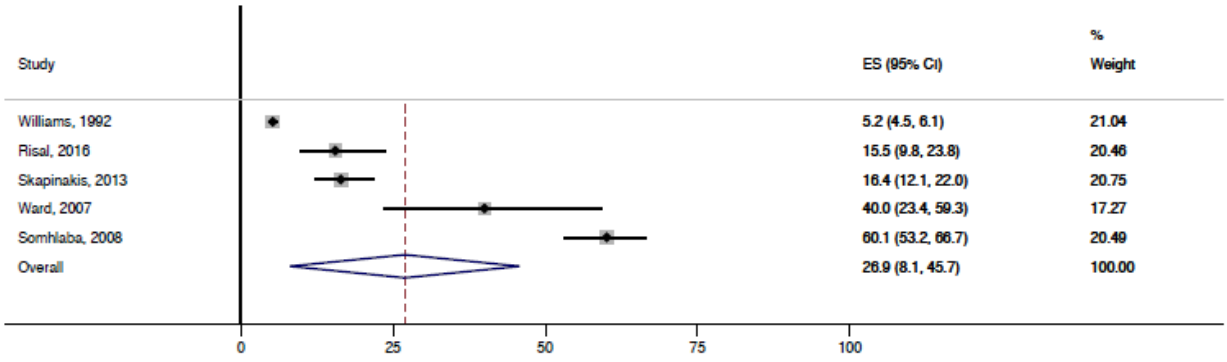

Figure 3. Meta-analysis of anxiety disorder prevalence

Table 1. Study Characteristics

Study	Study year	Country	n widowed	%-male	Age group	Instrument and Cut-off Score or Diagnostic Criteria used
Almeida-Filho, 2004	-	Brazil	132	12.12	-	PSAD/QMPA[a], >22 on PSAD/QMPA & >12 on depression subscale
Arias-de la Torre, 2018	2014	Spain	1582	15.93%	≥18	PHQ[b] 8-item, ≥10
Asokan, 2018	-	Bahrain	177	-	≥65	GDS[c] 15-item, ≥5
Bartwal, 2017	2013	India	177	-	>60	GDS 5-item, >1 yes
Bekaroglu, 1991	1989	Turkey	152	-	≥60	Hamilton, >13
Bergdahl, 2007	2000	Sweden	274	17.88	≥85	GDS 15-item, >5, supplemented by MADRS[d], no cut-off stated.
Bielecki, 2015	2003	Poland	85	-	-	BDI, ≥10
Blazer, 1980	1972	USA	462	17.75	≥65	OARS[e], ≥4 out of 7 criteria, yes to >1/2 of dysphoria-items
Cakici, 2017	2016	North Cyprus	73	-	>18	BDI[f] 21 items, ≥17
Cardona, 2015	2012	Colombia	1197	19.47	≥60	GDS, >5
Carpiniello, 1989	-	Italy	91	-	≥65	PSE[g]-assessment
Cho, 1998	1995	Korea	137	-	<60	CES-D[h], ≥16
Clayton, 1972	1968	USA	109	30.28	20-90	Clinical examination
de Oliveira, 2012	2010	Brazil	81	-	≥60	Abbreviated CDS, not stated
Deyessa, 2008	2002	Ethiopia	170	0 (100% female)	<50	CIDI[i] v. 2.1., ICD-10
El-sherbini, 2009	-	Egypt	21	-	<60	SCAN-interview, DSM
Golden, 2009	1993	Ireland	494	21.86	≥65	GMS[j], AGE-CAT
Hailemariam, 2012	2003	Ethiopia	389	-	>18	WMH-CIDI, ICD-10
Hällström, 1984	-	Sweden	21	0 (100% female)	38, 46, 50 and 54	Clinical examination, DSM-III
Jacobs, 1989	-	USA	111	23	<65	SCID, DSM-III
Jones-Webb, 1993	1984	USA	478	-	<70	CES-D, ≥16
Kennedy, 1989	1984	-	895	-	≥65	CES-D, ≥16
Luppa, 2012	1997	Germany	554	-	≥75	CES-D, ≥16
Madianos, 2011	2007	West Bank	33	-	≤70	SCID, DSM-IV
Mossie. 2016	2014	Ethiopia	20	-	≥18	BDI v. 2., ≥14
Nachvian, 2005	1998	Turkey	38	21.05	≥55	GDS-LF, ≥11
O'Connor, 2010	2006	Denmark	296	38	≥65	BDI 20 items, >9
Ohayon, 1999	1994	UK	604	-	≥15	Sleep-Eval, acc. to DSM-IV
Onrust, 2007	-	Netherlands	216	36.2	≥55	CES-D 20-item, ≥16
Pahkahla, 1995	1989	Finland	393	17.05	≥65	Clinical assessment, DSM-III
PS, 2017	-	India	83	0% (100% female)	40-60	PHQ 9-item, ≥10
Risal, 2016	2003	Nepal	103	-	≤65	HADS, >11
Sapranaviciute-Zabazlajeva, 2014	2006	Lithuania	972	17.18	45-72	CES-D 10-item, ≥4
Sinha, 2013	2012	India	39	-	≥60	GDS 15-item, ≥5
Skapinakis, 2013	2009	Greece	213	-	≥70	CIS-R[k], ICD-10
Somhlaba, 2008	-	South Africa	198	9.6	21-99	Depression: BDI 21-item, ≥14, Anxiety: BAI[l], ≥8
St John, 2009	1991	Canada	706	18	≥65	CES-D, ≥15
Stephenson-Cino, 1992	-	Canada	457	15.2	>65	CES-D, ≥16
Vézina, 1988	-	Canada	59	-	60-90	BDI, ≥10
Ward, 2007	-	Australia	25	28	65-80	DASS[m], Depression: ≥10, Anxiety: ≥8

Williams, 1992	1980	USA	3031	16.5	-	DIS[n], DSM-III
Yopp, 2015	2012	USA	259	100 (all male)	>18	CES-D, ≥16

Abbreviations explained: [a]Psychosomatic-Anxiety-Depression subscale of the Questionário de Morbidade Psiquiatrica de Adultos, [b]The Patient Health Questionnaire, [c] Geriatric Depression Scale, [d]Montgomery-Åsberg Depression Rating Scale, [e]Older American Resources and Services Depression Scale, [f]Beck Depression Inventory, [g]Present State Examination, [h]The Centre for Epidemiologic Studies of Depression, [i]Composite International Diagnostic Interview, [j]Geriatric Mental State, [k]Revised Clinical Interview Schedule,[l]Beck Anxiety Inventory,[m]Depression Anxiety Stress Scales, [n]The Diagnostic Interview Schedule